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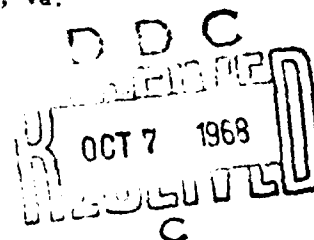
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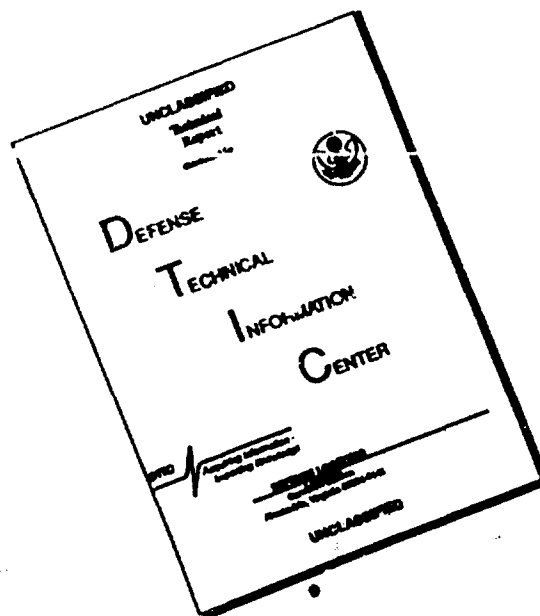
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THE DYNAMICS OF C-REACTIVE PROTEIN IN PATIENTS WITH DIFFERENT INFECTIOUS DISEASES

[Following is the translation of an article by T. I. Bolshun, Ye. M. Bylinkina and A. G. Ishchuk, Faculty of Infectious Diseases (Head - Prof. P. A. Alisov) of the Military-Medical Order of Lenin Academy imeni S. M. Kirova, Leningrad, published in the Russian-language periodical Klinicheskaya Meditsina (Clinical Medicine) 43(1), 1965, pages 39--42. Translation performed by Sp/7 Charles T. Ostertag Jr.]

C-reactive protein (CRP) is absent in the blood serum of healthy persons. Its appearance is connected with the formation, in the patient human, of a pathological process, characterized by the presence of inflammatory and destructive changes in the tissues, and does not depend on the etiology of the disease. CRP appears in the first days of illness, then the content of it is reduced rapidly; it disappears from the blood considerably earlier than clinical recovery sets in. The degree of concentration of CRP depends on the severity of the pathological process, therefore its determination in the blood serum of a patient has not only a diagnostic, but a prognostic importance.

In a chemical respect protein is close to the fraction of albumins and possesses good antigenic properties. When McCary (1947) obtained it in a crystal form, this was the prerequisite for obtaining CRP antiserum. This made it possible for scientists and clinicians to carry out extensive investigations among various groups of patients for determining the nature and content of CRP in the blood serum of the patients.

Over a period of 33 years, which has passed since the discovery of CRP by the American microbiologists Tillet and Francis (1930), many papers have been published on the determination of it in the blood serum of patients with various infectious diseases (Ash, 1933; Havens, 1950; Milten, Gal, 1958; L. A. Shmerling and P. M. Pashinin; G. G. Lapina et al; L. N. Zhuk; Ye. N. Kabakov; V. G. Mosin and P. M. Pashinin).

However, comparatively few reports have dealt with the determination of CRP in the blood serum of patients with scarlet fever (A. I. Ivanov and P. M. Pashinin), and in many viral and rickettsial infections (ornithosis, infectious erythema, mononucleosis, typhus) it has not been determined. Reports concerning the investigation of blood for CRP during infectious hepatitis are many, but the authors present diverse, sometimes contradictory, data. Havens and coworkers investigated the blood serum of 90 patients and did not obtain one positive reaction. In an investigation of 107 patients L. A. Shmerling and P. M. Pashinin noted a positive reaction in 69 cases.

The variance in the data cited can probably be explained by the considerable fluctuations in the number of observations, different sensitivity in the methods used for detecting CRP, and investigations being carried out during different stages of illness. Up until the present time the literature has not contained any comparative data on the presence of CRP in the blood serum of patients with various infectious diseases depending on the etiological factor.

We carried out the determination of CRP in the blood serum of 471 patients with infectious diseases (1560 analyses), using the method of Anderson and McCarty, simplified by P. M. Pashinin. There were 187 patients (416 analyses) with coccal infections (scarlet fever, pneumonia), viral and rickettsial infections (ornithosis, infectious mononucleosis and hepatitis, infectious erythema, typhus) - 139 (730 analyses), bacillary diseases (dysentery, typhoid, brucellosis) - 93 (206 analyses), and others (cholecystocholangitis, cirrhosis, arthritis) - 52 patients (118 analyses). During the acute stage of the disease CRP was detected with the same frequency in all the diseases: Coccal infections - 69% of the patients, viral infections - 63%, and bacillary - 61% (table 1).

CRP was detected most often in patients with severe and moderate forms of illness. Thus, with a course of moderate severity, CRP was detected in 59 out of 67 scarlet fever patients, in 23 out of 26 typhoid patients, in 10 out of 11 typhus patients, and during a severe course of infectious hepatitis - in all the patients (10). During light forms of illness CRP was detected in half of those investigated (72 out of 144), and in suppressed forms - only in individual patients. The concentration of CRP in the blood serum was considerably greater during expressed clinical forms of disease. Thus during severe and moderate forms of illness sharply positive reactions were observed in 22 out of 118 patients, and during light forms in 6 out of 144.

In the majority of non-complicated infectious diseases CRP was detected up to the 10th day of illness, for typhoid and infectious hepatitis - up to the 15th day, and then its content in the blood serum dropped sharply (table 2).

During severe and moderate forms of disease CRP was detected for a longer period of time than during light and suppressed forms. Thus, during severe and moderate forms of infectious hepatitis 35% positive reactions were observed on the 30th day of illness, and with light and suppressed forms - only individual positive reactions.

We observed a parallelism between the intensity of the reactions and high figures of bilirubin, activity of aldolase and transaminase of the blood. As a rule, intense reactions were noted with an accelerated ESR - above 12 mm an hour (22 patients); negative reactions with an accelerated ESR were not detected. With a chronic course of illness (chronic dysentery,

brucellosis, latent forms, cholecystocholangitis without aggravation) negative reactions were observed; following aggravation and relapse of the disease CRP again appeared in the blood serum.

Accompanying helminth and Protozoan infestation did not exert a significant influence on the frequency of positive reactions. Thus, in patients with infectious hepatitis with an accompanying infestation positive reactions were observed in 16 out of 30 cases, and in the absence of infestation - in 40 out of 70.

Conclusions

1. During coccal, viral, and bacillary infections the frequency of detecting CRP in the blood serum of patients was approximately the same.
2. CRP appears in the acute phase of various infectious diseases and does not serve as a specific index of a pathological process for specific groups of infections.
3. The concentration of CRP in the blood serum depends on the severity of the infectious disease and is found in direct dependency on other indices of inflammatory phenomena in the tissues of the organism (ESR, bilirubin, activity of aldonase and transaminase of the blood).
4. During aggravation and complication of the infectious disease, CRP appears again in the blood serum.

Literature

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Table 1

Frequency of positive reactions for C-RP in patients with various infectious diseases (in the acute period of the disease)

Infection	Diagnosis	Number of patients	Reaction		% of positive reactions
			Positive	Negative	
Coccal	Scarlet fever	166	114	52	68
	Pneumonia	21	15	6	--
	Total	187	129	58	69
Viral	Infectious hepatitis	100	56	44	56
	Typhus	11	10	1	--
	Other viral infections	28	22	6	--
	Total	139	88	51	63
Bacillary	Dysentery	38	19	19	--
	Typhoid	26	23	3	--
	Brucellosis	16	10	6	--
	Food toxoinfection	13	5	8	--
	Total	93	57	36	--

Table 2

Frequency of positive reactions to C-RP in various periods of the disease

Diagnosis	Reaction	Days of illness				
		up to the 10th	from 10 to 15	from 15 to 20	from 21 to 30	from 31 to 40
Infectious hepatitis	Positive Negative	37 7	67 18	27 55	21 71	19 166
Typhus	Positive Negative	10 1	1 4	1 10	-- --	-- --
Ornithosis	Positive Negative	6 1	-- 7	-- --	-- --	-- --
Scarlet Fever	Positive Negative	114 52	6 160	-- --	-- --	-- --
Typhoid	Positive Negative	23 3	9 --	1 --	-- 26	-- --